MODE 1 COMMON EQUIPMENT INSTALLATION AND PRETEST

This Section provides procedures to install and pretest the ITT D448 Mode 1 common equipment.

This Section has been reissued to include information on the handling of NMOS-equipped units.

Installation consists of plugging the units into their appropriate slots. Pretest for the common equipment consists of checking the voltage levels on the power converter unit (PCU) and looping each digroup while checking the alarm indicators on the trunk processor and alarm (TPA) units and other common equipment units.

WARNING: This equipment contains static-sensitive (NMOS) devices. Section ITTR-18-599 contains handling instructions for MOS-equipped units.

Note: There are no field-selectable options on the common equipment units.

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1—Inspection 1

2—Power Converter Unit Installation 2

3—Common Equipment Installation and Pretest 4

CHART 1

INSPECTION

APPARATUS

None

STEP	PROCEDURE
1	Remove equipment from shipping carton(s).
2	Perform an inventory to verify that all equipment listed on packing list is present.
3	Inspect the equipment for shipping damage. Report any damage to carrier immediately.

CHART 2

POWER CONVERTER UNIT INSTALLATION

APPARATUS:

1—Volt-ohm meter (VOM) (WE KS-14510, Triplett 630, or equivalent)

Standard hand tools as required (see Section ITTR-18-400)

STEP	PROCEDURE
1	At fuse, alarm and distribution panel (FADP) or power board, remove fuses for – 48V power source (to multiplex terminal) and 20-Hz ringing source.
2	Verify that connector keys are installed in multiplex shelf common equipment connectors as shown in Table A and Fig. 1.

TABLE A

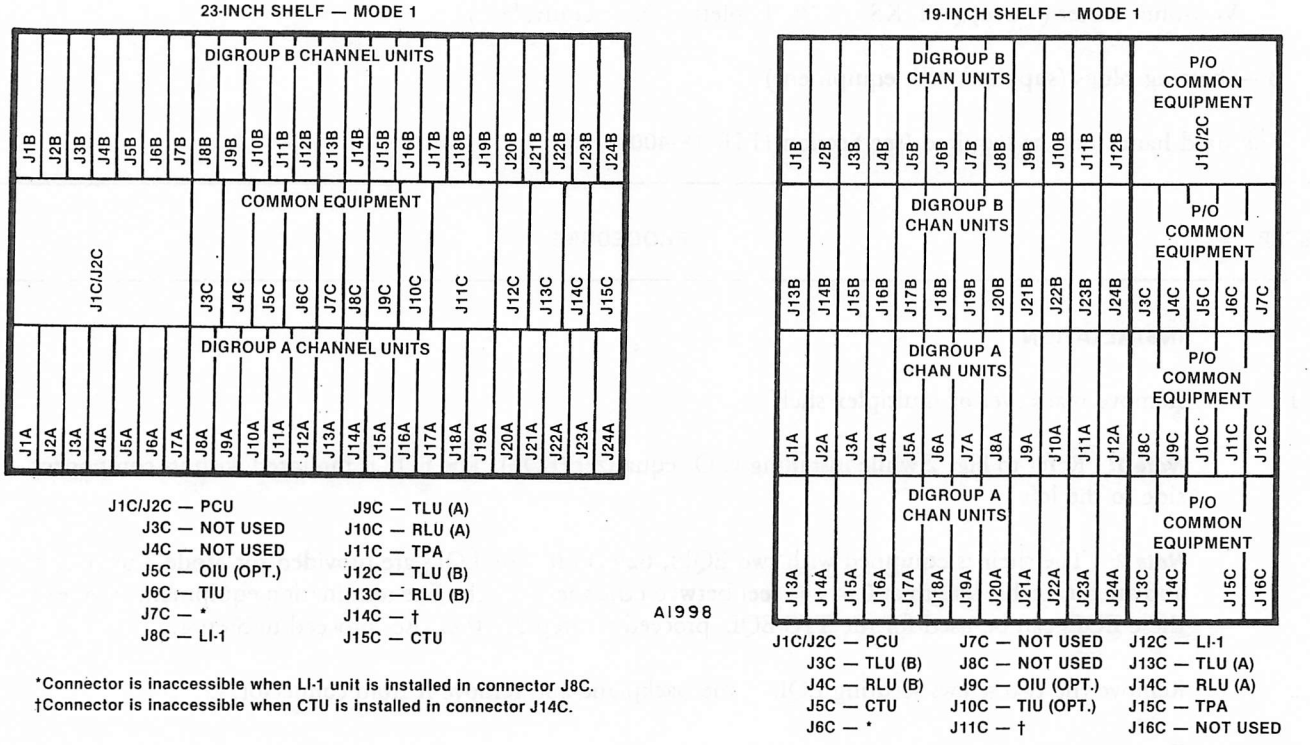
23-INCH SHELF		19-INCH SHELF	
CONNECTOR	KEY SLOTS	CONNECTOR	KEY SLOTS
J1C/J2C	19, 54	J1C/J2C	19, 54
J3C	23, 58	J3C	27, 62
J4C	8, 43	J4C	13, 48
J5C	5, 40	J5C	22, 57
J6C	18, 53	J6C	21, 56
J7C	15, 50	J7C	8, 43
J8C	15, 50	J8C	23, 58
J9C	27, 62	J9C	5, 40
J10C	13, 48	J10C	18, 53
J11C	21, 56	J11C	15, 50
J12C	27, 62	J12C	15, 50
J13C	13, 48	J13C	27, 62
J14C	22, 57	J14C	13, 48
J15C	21, 56	J15C	21, 56
		J16C	9, 44

3	Install PCU in connector J1C/J2C of multiplex shelf.
4	Secure PCU in slot by tightening screw on front panel.
5	Replace fuses removed in Step 1.
6	Verify that PWR FAIL LED on PCU is off.

Note: If PWR FAIL LED on PCU is on, disengage PCU from its connectors and reinstall it. (Screw must be loosened and PCU released from connector to disengage. To reinstall, repeat Steps 3 and 4.) If LED remains on, check for – 48V on – 48V and GND test points on PCU. If – 48V is not present, restore it. If – 48V is present, replace PCU.

CHART 2 (Cont)

STEP	PROCEDURE


23-INCH SHELF — MODE 1
DIGROUP B CHANNEL UNITS
COMMON EQUIPMENT
DIGROUP A CHANNEL UNITS
J1C/J2C
J1B J2B J3B J4B J5B J6B J7B J8B J9B J10B J11B J12B J13B J14B J15B J16B J17B J18B J19B J20B J21B J22B J23B J24B
J3C J4C J5C J6C J7C J8C J9C J10C J11C J12C J13C J14C J15C
J1A J2A J3A J4A J5A J6A J7A J8A J9A J10A J11A J12A J13A J14A J15A J16A J17A J18A J19A J20A J21A J22A J23A J24A
J1C/J2C — PCU
J3C — NOT USED
J4C — NOT USED
J5C — OIU (OPT.)
J6C — TIU
J7C — *
J8C — LI-1
J9C — TLU (A)
J10C — RLU (A)
J11C — TPA
J12C — TLU (B)
J13C — RLU (B)
J14C — †
J15C — CTU
*Connector is inaccessible when LI-1 unit is installed in connector J8C.
†Connector is inaccessible when CTU is installed in connector J14C.
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19-INCH SHELF — MODE 1
DIGROUP B CHAN UNITS
DIGROUP A CHAN UNITS
P/O COMMON EQUIPMENT
J1C/2C
J1B J2B J3B J4B J5B J6B J7B J8B J9B J10B J11B J12B
J13B J14B J15B J16B J17B J18B J19B J20B J21B J22B J23B J24B
J3C J4C J5C J6C J7C
J1A J2A J3A J4A J5A J6A J7A J8A J9A J10A J11A J12A
J8C J9C J10C J11C J12C
J13A J14A J15A J16A J17A J18A J19A J20A J21A J22A J23A J24A
J13C J14C J15C J16C
J1C/J2C — PCU
J3C — TLU (B)
J4C — RLU (B)
J5C — CTU
J6C — *
J7C — NOT USED
J8C — NOT USED
J9C — OIU (OPT.)
J10C — TIU (OPT.)
J11C — †
J12C — LI-1
J13C — TLU (A)
J14C — RLU (A)
J15C — TPA
J16C — NOT USED
*Connector is inaccessible when CTU unit is installed in connector J5C.
†Connector is inaccessible when LI-1 is installed in connector J12C.

Fig. 1—D448 Multiplex Terminal, Mode 1 Operation

7 Connect VOM, set to volts dc scale, across PCU test points listed in Table B and GND test point to verify proper output voltage.

TABLE B

TEST POINT	REQUIREMENT
+7V	+6.00 to +8.00 Vdc
−2.5V	−2.25 to −2.75 Vdc
−5V	−4.75 to −5.25 Vdc
−7.5V	−7.25 to −7.75 Vdc
−10V	−9.50 to −10.50 Vdc
−17V	−16.0 to −18.0 Vdc
−48V	−42.0 to −56.0 Vdc

8 If 20-Hz ringing voltage is connected to multiplex terminal, connect VOM set to volts ac scale across GND and RNGA test points on PCU.

Requirement: VOM reads value of office ringing supply.

9 Repeat Step 8 using RNGB instead of RNGA.

CHART 3

COMMON EQUIPMENT INSTALLATION AND PRETEST

APPARATUS:

1—Volt-ohm meter (VOM) (WE KS-14510, Triplett 630, or equivalent)

3—Shorting plugs (supplied with equipment)

Standard hand tools as required (see Section ITTR-18-400)

STEP	PROCEDURE

INSTALLATION

1 Remove rear cover of multiplex shelf.

Note 1: Refer to Fig. 2 while installing C.O. equalizer (EQL). The EQL is mounted with its component side to the left.

Note 2: The shelf is equipped with two EQLs, 628045-0. The EQLs are provided for Mode 3 operation and are for a cable length of 0 to 133 feet between the shelf and the line termination equipment. If one of these EQLs can be used for the T1C EQL, proceed to Step 2; otherwise, proceed to Step 4.

2 Remove the two screws securing EQL to the backplane and remove it from connector.

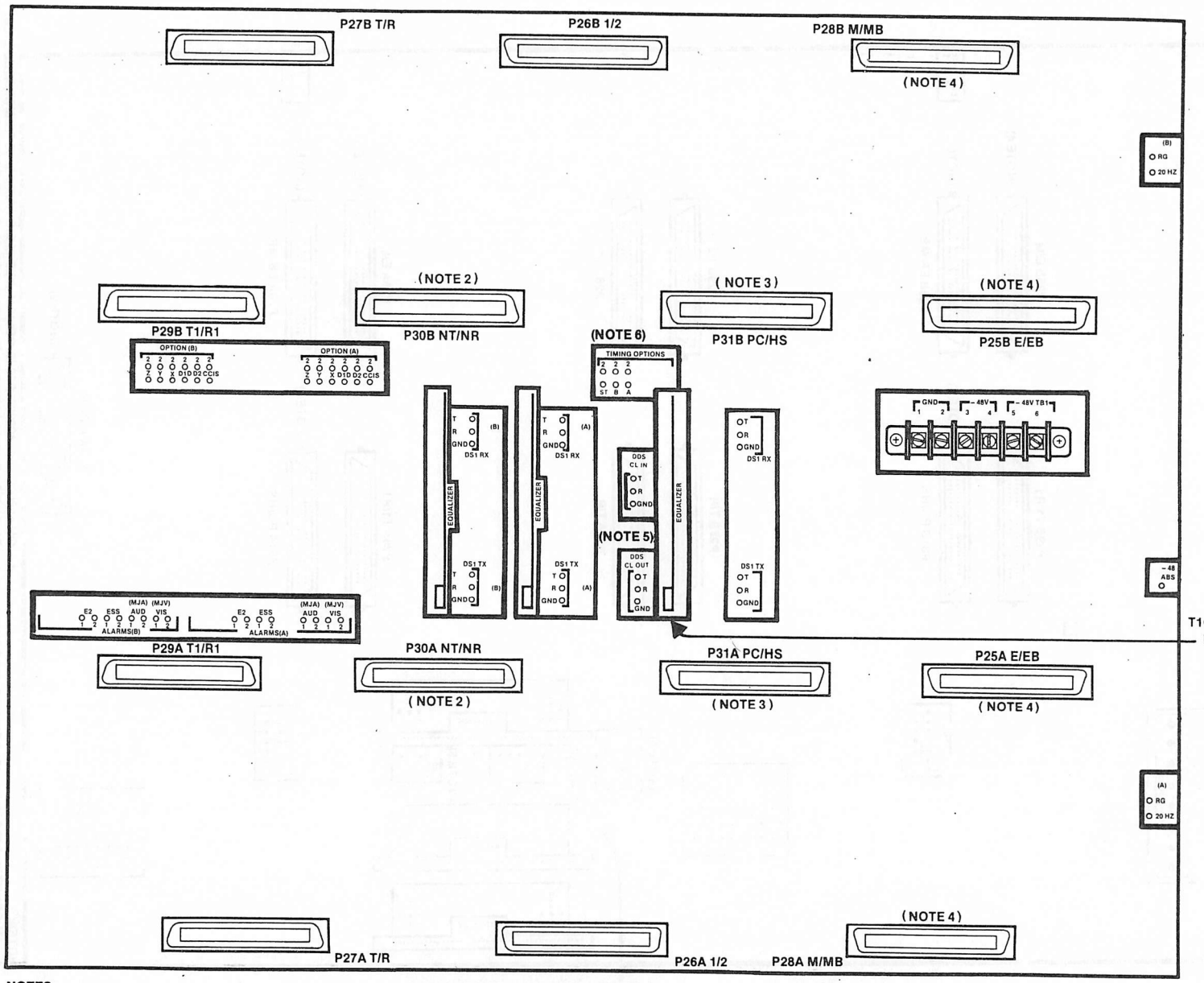
3 Proceed to Step 5.

4 If a different EQL is required, select one which matches the cabling distance between the shelf and the line termination equipment (Table C).

TABLE C

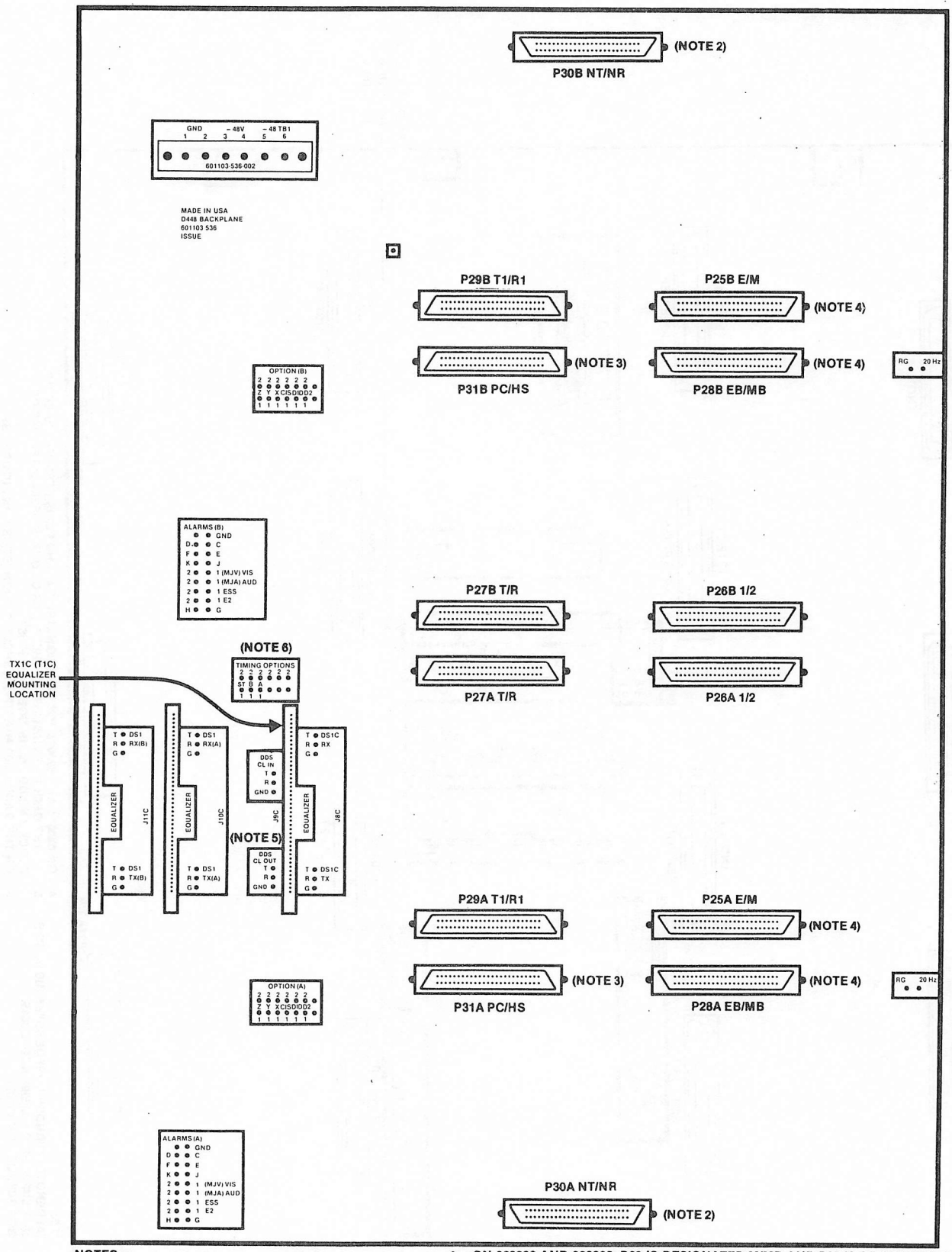
EQL CATALOG NO.	CABLE LENGTH (MULTIPLEX TERMINAL TO LINE TERMINATION EQUIPMENT)
628045-0	0-133 ft (0-41 m)
628045-1	134-267 ft (42-81 m)
628045-2	268-400 ft (82-122 m)
628045-3	401-533 ft (123-162 m)
628045-4	534-655 ft (163-200 m)

5 Install EQL on last four pins of right-hand row of connector J5C (23-inch shelf) or J9C (19-inch shelf), and secure it to backplane with the two screws provided.



NOTES:
1. (A) DENOTES DIGROUP A; (B) DENOTES DIGROUP B.
2. NOT SUPPLIED ON 628005 AND 628015.
3. NOT SUPPLIED ON 628005.
4. ON 628011 AND 628015, P28 IS DESIGNATED E/M AND P25 IS DESIGNATED EB/MB.
5. ON THE GROUP -001 MULTIPLEX SHELF, DDS CL OUT IS DESIGNATED OFFICE CLOCK AND DDS CL IN DOES NOT EXIST.
6. ON THE GROUP -003 MULTIPLEX SHELF, OPTION [ST] IS FOR FUTURE USE.

Fig. 2A—EQL Locations for 23-Inch Shelf



NOTES:
1. (A) DENOTES DIGROUP A; (B) DENOTES DIGROUP B.
2. NOT SUPPLIED ON 628008 AND 628018.
3. NOT SUPPLIED ON 628008.
4. ON 628003 AND 628008, P28 IS DESIGNATED M/MB AND P25 IS DESIGNATED E/EB.
5. ON THE GROUP -001 MULTIPLEX SHELF, DDS CL OUT IS DESIGNATED OFFICE CLOCK AND DDS CL IN DOES NOT EXIST.
6. ON THE GROUP -003 MULTIPLEX SHELF, OPTION [ST] IS FOR FUTURE USE.

Fig. 2B—EQL Locations for 19-Inch Shelf

CHART 3 (Cont)

STEP	PROCEDURE

6 Replace rear cover of multiplex shelf.

Note: As each common equipment unit is inserted in Step 7, the PWR FAIL LED on PCU should remain off. If it turns on, it indicates that the overvoltage or overcurrent protection circuitry in the PCU has been activated, and the common equipment unit that caused the LED to turn on may be faulty and should be replaced. If the protection circuitry is activated, the PCU can be reset by momentarily removing it from its connector and then reinserting it. As soon as a TPA unit is inserted, the alarm cutoff (ACO) switch should be pressed.

7 Install common equipment units in sequence indicated in Table D.

TABLE D

UNIT	PART NO.	CONNECTOR*	
		23-INCH SHELF	19-INCH SHELF
Office Interface Unit (OIU)†‡	628090	J5C	J9C
Office Interface Unit (OIU/DDS)‡	628095	J5C	J9C
Test Interface Unit (TIU)†	628455	J6C	J10C
Line Interface, Mode 1 (LI-1)	628050	J8C	J12C
Transmit Logic Unit (TLU) for Digroup A	628020	J9C	J13C
Transmit Logic Unit (TLU) for Digroup B	628020	J12C	J3C
Receive Logic Unit (RLU) for Digroup A	628025	J10C	J14C
Receive Logic Unit (RLU) for Digroup B	628025	J13C	J4C
Trunk Processor and Alarm (TPA) Unit	628030	J11C	J15C
Cut-Thru Unit (CTU)	628075	J14C	J5C

*Connector positions are shown in Fig. 1.
†This unit is optional. TIU is supplied with multiplex shelves, 628001, 628003, 628005, and 628008.
‡If this unit is to be installed, strap between pins 18 and 53 must be cut.

8 Before proceeding with the remainder of this chart, channel units should have options selected and be installed in accordance with Section ITTR-18-440 and/or ITTR-18-441.

9 Check status of LOOP LED on TPA unit. If on, press LOOP button on TPA unit to remove from loop condition.

10 Check status of TP MEM button on each TPA unit. If in, press to release.

11 Insert a shorting plug in LOOP test points on LI-1.

Requirement: All indicators on common equipment, except LOOP LED on TPA unit, should be off. If not, refer to Section ITTR-18-531 for alarm trouble location procedures.

CHART 3 (Cont)

STEP	PROCEDURE

12 Connect VOM, set to volts dc scale, across PCU test points listed in Table E and GND test point to verify proper output voltage.

TABLE E

TEST POINT	REQUIREMENT
+7V	+6.00 to +8.00 Vdc
−2.5V	−2.25 to −2.75 Vdc
−5V	−4.75 to −5.25 Vdc
−7.5V	−7.25 to −7.75 Vdc
−10V	−9.50 to −10.50 Vdc
−17V	−16.0 to −18.0 Vdc
−48V	−42.0 to −56.0 Vdc

PRETEST

Note 1: If any requirement during pretest is not met, refer to Section ITTR-18-531 for trouble location procedures.

Note 2: Proceed to Step 13 if it is desired to pretest the alarm system on a single-ended (looped) basis. Proceed to Step 27 if it is desired to pretest the alarm system on an end-to-end basis and if the far-end terminal is an ITT D448. Proceed to Step 39 if it is desired to pretest the alarm system on an end-to-end basis and if the far-end terminal is anything other than an ITT D448. Proceed to Step 46 if it is not desired to pretest the alarm system.

A. Single-Ended Alarm Pretest

Note: The LOOP LED on TPA unit remains on throughout this test.

13 On TPA unit, insert shorting plug in FTP test points.

Requirement: TPA unit CGA counter is incremented and after a delay of 2.5 seconds or 450 milliseconds (depending on option selection), RMA and TPA indicators on TPA unit turn on.

14 On TPA unit, press ACO button.

Requirement: On TPA unit, ACO LED turns on.

15 On TPA unit, press LOOP button.

Requirement: On TPA unit, RMA LED turns off.

16 On TPA unit, remove shorting plug from FTP test points.

CHART 3 (Cont)

STEP	PROCEDURE
17	On TPA unit, press LOOP button. ***Requirement:*** On TPA unit, RMA LED turns on. After a delay of 12.5 seconds; RMA, ACO, and TPA indicators turn off indicating that alarm has cleared.
18	On TPA unit, press TP MEM button.
19	Release TLU for Digroup A from its connector. ***Requirement:*** On TPA unit, CGA counter is incremented immediately. After a delay of 2.5 seconds or 450 milliseconds (depending on option selection), the following indicators turn on; LCA, TPA, and TP MEM on TPA unit; SYNC FAIL on LI-1; FR LOSS on RLU.
20	Reinsert TLU in its connector. ***Requirement:*** On TPA unit RMA LED turns on, and LCA LED turns off immediately. SYNC FAIL LED on LI-1 and FR LOSS LED on RLU for Digroup A turn off immediately. After a delay of 12.5 seconds; RMA and TPA indicators on TPA unit turn off, indicating that alarm has cleared.
21	On TPA unit, release TP MEM button. ***Requirement:*** On TPA unit, TP MEM LED turns off.
22	Release RLU for Digroup A from its connector. ***Requirement:*** On TPA unit, CGA counter is incremented immediately. After a delay of 2.5 seconds or 450 milliseconds (depending on option selection); LCA and TPA indicators on TPA unit turn on.
23	Reinsert RLU for Digroup A in its connector. ***Requirement:*** On TPA unit, LCA LED turns off immediately and RMA LED turns on. After a delay of 12.5 seconds; RMA and TPA indicators turn off, indicating that alarm has cleared.
24	Release LI-1 from its connector. ***Requirement:*** On TPA unit, CGA counter is incremented immediately. After a delay of 2.5 seconds or 450 milliseconds (depending on option selection), LCA and TPA indicators on TPA unit turn on. RMA LED on TPA unit and FR LOSS LEDs on both RLUs may or may not be on.
25	Reinsert LI-1 in its connector. ***Requirement:*** LCA LED on TPA unit and FR LOSS LEDs on both RLUs turn off immediately. After a delay of 12.5 seconds, RMA and TPA indicators on TPA unit turn off, indicating alarm has cleared.

CHART 3 (Cont)

STEP	PROCEDURE
26	Repeat Steps 19 through 23 for Digroup B.
	Note: Proceed to Step 27 if it is desired to pretest the alarm system on an end-to-end basis and if the far-end terminal is an ITT D448. Proceed to Step 39 if it is desired to pretest the alarm system on an end-to-end basis and if the far-end terminal is anything other than an ITT D448. Proceed to Step 46 if it is not desired to pretest the alarm system on an end-to-end basis.
	B. End-to-End Alarm Pretest with ITT D448 Terminal at Far End
	Note: The system must be end-to-end non-alarmed operational including span line (transmission medium) to perform this test.
27	Designate near-end terminal as local terminal and far-end terminal as remote terminal.
28	At remote terminal LI-1, remove shorting plug from LOOP test points.
	Requirement: At remote terminal; LCA, RMA, and TPA indicators on TPA unit turn on.
29	At local terminal LI-1, remove shorting plug from LOOP test points.
	Requirement: At remote terminal, all indicators except TPA lamp turn off immediately. At local terminal, RMA and TPA indicators on TPA unit turn on. After a delay of 12.5 seconds, all indicators at both ends are off.
30	At local terminal TPA unit, insert shorting plug in FTP test points.
	Requirement: At both terminals, CGA counter on TPA unit is incremented immediately. After a delay of 2.5 seconds or 450 milliseconds (depending on option selection) at local terminal, TPA lamp on TPA unit turns on; at remote terminal, RMA and TPA indicators on TPA unit turn on.
31	At local terminal TPA unit, remove shorting plug from FTP test points.
	Requirement: After a delay of 12.5 seconds, all indicators at both ends turn off, indicating that alarm has cleared.
32	At local terminal, release TLU for Digroup A from its connector.
	Requirement: At both terminals, CGA counter on TPA unit is incremented immediately. The following indicators turn on; LCA and TPA on TPA units at both terminals; at remote terminal, SYNC FAIL on LI-1 and FR LOSS (may or may not turn on) on RLU for Digroup A.
33	At local terminal, reinsert TLU for Digroup A.
	Requirement: LCA LEDs at both terminals turn off immediately. At remote terminal, SYNC FAIL and FR LOSS LEDs on RLU turn off immediately. At local terminal, TPA LED on TPA unit turns on immediately. After a delay of 12.5 seconds, all indicators at both ends turn off, indicating that the alarm has cleared.

CHART 3 (Cont)

STEP	PROCEDURE
34	At local terminal, repeat Steps 32 and 33 for Digroup B.
35	Reverse designations assigned in Step 27 and repeat Steps 28 through 34.
36	At local terminal, insert shorting plug in LOOP test point on LI-1.
37	At remote terminal, insert shorting plug in LOOP test points on LI-1.
38	Proceed to Step 48.
	C. End-to-End Alarm Pretest with Terminal Other Than ITT D448 at Far End
	Note: The system must be end-to-end non-alarmed operational including span line (transmission medium) to perform this test.
39	Unloop far-end terminal.
40	At LI-1, remove shorting plug from LOOP test points.
	Requirement: After a delay of 12.5 seconds, all alarm indicators at both ends are off.
41	At TPA unit, insert shorting plug in FTP test points.
	Requirement: TPA unit CGA counter is incremented immediately. After a delay of 2.5 seconds or 450 milliseconds (depending on option selection), TPA lamp on TPA unit turns on and far-end terminal goes into remote alarm.
42	At TPA unit, remove shorting plug from FTP test points.
	Requirement: After a delay of 12.5 seconds, all alarm indicators at both ends turn off, indicating that alarm has cleared.
43	Release TLU for Digroup A from its connector.
	Requirement: TPA unit CGA counter is incremented immediately. After a delay of 2.5 seconds or 450 milliseconds (depending on option selection), LCA and TPA indicators on TPA unit turn on and far end goes into local alarm.
44	Reinsert TLU for Digroup A.
	Requirement: On TPA unit, LCA LED turns off immediately. After a delay of 12.5 seconds, all alarm indicators at both ends turn off, indicating that alarm has cleared.
45	Repeat Steps 43 and 44 for Digroup B.

CHART 3 (Cont)

STEP	PROCEDURE
	LOOPED OPERATION
46	At far end, loop terminal.
47	At LI-1, insert shorting plug in LOOP test points.
48	The terminal is now operating in a looped condition. It should be left in this condition until the channel unit tests (Section ITTR-18-443, ITTR-18-445 and/or ITTR-18-447) are completed, if they are required, or until the channels are placed in service.